the burrows were shallow, but one was found to extend for a distance of five feet into the perpendicular face of a hard sand hill. This burrow was about an inch in diameter and inclined slightly upward from the entrance. At the terminus of the burrow was a small, flat nest of dead grasses and a little pile of shelled pods of a wild pea (*Galactia* sp.). Another burrow was about three feet long and contained a similar nest and pile of pea pods.

GENERAL NOTES

ATTACKED BY A COUGAR?

In February last, during a short expedition in Venezuela, I had an interesting encounter with a cougar which seems worth relating as a possible addition to the rather scanty evidence that this animal does not always flee from man. The incident occurred in the foothills of the Sierra de Perijà near the Rio Cogollo, some eighty miles southwest of the city of Maracaibo. This locality is on the frontier of the region held by the hostile Motilone Indians and therefore little frequented and practically in virgin condition.

At about ten o'clock one morning, after visiting a short line of traps and spending several hours hunting for deer, I started to backtrack toward camp, following in general the same fairly marked deer trails over which I had just passed. Although the forest was rather thin, passage was impeded by light but much entwined underbrush except on these trails or in occasional small grassy openings suggestive of the extensive savannas lying a few miles eastward. At a turn in the trail and on the crest of a wooded knoll, when I was halfway to camp, feeling the heat of the powerful sun, passing a spot previously reconnoitered carefully for deer, and hence not so alert as before, I was suddenly confronted by what to my astonished eyes seemed the largest cougar that ever grew. It started from behind some low bushes at my left and fifty feet, or at most sixty feet, in front of me. I did not see it rise, but it gave the impression of having been lying down. The forest was rather scraggly at this point and the trail I was following was dissolved in several small openings, in one of which the animal appeared, so the sensation of meeting it directly in the trail was lost. It started toward me immediately, growling savagely, its eyes blazing, tail lashing, and if there was any indication that it did not intend to make away with me, I failed to recognize it. It did not come on the run, however, and whether it would have done so or not I cannot say, for its long feline strides were so full of determination I did not care to await developments but promptly fired a load of buckshot full into its face. It dropped instantly and rolled behind some small bushes which prevented me from firing the second barrel. I had a flash of elation, but the glowering visage was still uppermost in my mind; so, instead of running in with my other barrel, I prudently stopped to reload the one already fired and while the gun was open the cougar rose and disappeared in a dense thicket leaving scattered drops of blood and a trail which I could not follow far without dogs. Failure to kill the beast of course caused considerable chagrin, but the unique experience was some consolation.

Both the appearance of the cougar in the daytime and its failure to run at first sight of a man are probably accounted for by the wildness of the region. Although human habitations are not far to the eastward, there are many square miles to the westward never traversed by white men and, although wild tribes still occupy some parts, there are many very large areas from which they too are absent. It is not impossible, therefore, that this cougar had never before seen a human being. This is perhaps less likely than that it had been following my trail, as it had that of other humans and, upon my sudden appearance, felt cornered, so advanced instead of retreating. At any rate, there is at least one person who is sufficiently convinced that some cougars under some circumstances may be far from cowardly. —*W. H. Osgood.*

THE JAGUAR IN COLORADO

Is this an additional jaguar record for the United States and a new mammal for Colorado? Rufus B. Sage, while camped on Soublet's Creek at the base of the Rockies, head waters of the Platte, within 30 or 40 miles of Long's Peak and 2 days' march from Fort Lancaster, in December of 1843, says: "One of our party encountered a strange looking animal in his excursions, which from his description, must have been of the Leopard family. This circumstance is the more remarkable, as Leopards are rarely found except in Southern latitudes. However, they are not infrequently met in some parts of the Cumanche country, and their skins furnish to the natives a favorite material for arrow-cases." (Rocky Mountain Life, p. 347.) As Sage was quite familiar with panthers and bobcats this may have been jaguar or ocelot.

—*Ernest Thompson Seton.*

DIURNAL NEST-BUILDING BY A WOOD RAT

Wood rats are usually considered nocturnal, or at least nocturnal and crepuscular, in their habits. On the W Triangle Ranch, near the head of Cataract Canyon, 12 miles west-southwest of Anita, Arizona, one was observed at 5:10 p.m., September 19, 1916, building a nest in a cavern among the rocks. The animal was first seen carrying *Gutierrezia* stems from just outside the entrance of the cavern, where it had apparently stored a small supply. It made two trips to this little pile, which was about 8 feet from the nest, gathered 5 or 6 stems in its mouth, and carried them to the nest, where it worked assiduously placing them with its mouth and fore-feet. After I had watched it for 5 minutes, it discovered me and hid its head behind a rock, and,—ostrich-fashion—seemed to think it was hidden. A slight movement on my part and it disappeared into a hole among the rocks back of the nest. When the rat was first observed she was exposed to direct sunlight which entered that part of the nest upon which she was working. And when she was trying to hide, though still visible, in the interior of the cavity, she was in diffused daylight—by no means in darkness.

The basal and external parts of the nest consisted of sticks (largely the woody part of *Atriplex* and *Gutierrezia*) and a smaller portion of pieces of cactus (mostly *Opuntia* and *Echinocereus*), which formed a semicircle around the anterior (near

the cavern entrance) part of the nest. Within this was a circle of coarse stems and leaves of *Gutierrezia*, inside of which was the nest proper, composed of fine plant-fibres and grama grass. The entire nest, sticks and all, was about 2⅔ feet long (length extending *into* the cavern) and 1½ feet wide (*across* the cavern). The part composed of plant fibre and grass was externally 8 inches in diameter, and internally (nesting cavity) 6 inches in diameter. The nesting cavity was 3 inches deep and entirely open above, evidently in process of construction.

My stay in this region was limited, so in order to be certain of the identity of the little nest-builder a Schuyler rat trap was set on the nest proper. Upon my return one-half hour later (5:45 p.m.) a female *Neotoma albigula albigula* (No. 215645, Biological Survey collection, United States National Museum) was in the trap. She had moderately developed mammæ but contained no embryos.

—*Hartley H. T. Jackson.*

A SECOND RECORD OF PHENACOMYS ALBIPES IN CALIFORNIA, WITH A DISCUSSION OF THE SPECIES

On July 11, 1919, the writer secured a young but apparently breeding female of *Phenacomys albipes* three miles north of Orick, Humboldt County, California, which specimen constitutes the second record of the species for the state. It was taken in an oat-baited trap under a log-jam near the bank of a stream which flows through dense redwood and maple forest. This individual does not fully agree with published descriptions, so S. W. Jewett kindly loaned me for comparison three specimens of this species from his own collection, and one belonging to the Oregon Fish and Game Commission. I was also generously permitted to examine the type of *albipes*, in the collection of the Bureau of Biological Survey. Indications point to the fact that most of the cranial differences shown by my specimen may be accounted for by its age, which is less than that of the others. However, it varies individually in having narrower incisive foramina with posterior constriction, and a slightly different enamel pattern.

As the six specimens of *P. albipes* before me are more than have ever been available for study heretofore, it seems desirable to put on record some of the *average* characters of the species as indicated by this series. I find that the feet of the type are the palest of any in the lot; they are of a pronounced grayish cast, and not pure white as in *P. orophilus*. The ears of the Orick example are covered with black hairs, while in the other five these members are almost naked. As with most other microtines, the enamel pattern of the molariform teeth varies considerably within certain limits, and one must be careful not to give equal weight to all dental differences. The enamel pattern of the upper teeth is rather constant in the five skulls of *albipes* at hand (the sixth is too old, worn, and broken to be of much value in this connection). In the case of the lower teeth, M_1 of the type is unusual in having the outer triangles very irregular in position and size; while, in the other four, these are quite uniform. The Orick specimen is peculiar in having the anterior trefoil of M_1 with the outer loop situated entirely posterior to the other two. In two specimens there is a tendency for the antero-external loop of M_2 to open. Normally, in M_3 there is a slight constriction in the enamel fold near the external end of the middle digitation, but in the Orick skull this is developed into a pronounced, though small, outer triangle.

After studying the California species of *Phenacomys*, I can see nothing to be gained by adopting the subgenus *Arborimus* Taylor. Most of the characters on which it is based are either very slight, or inconstant. It seems to me that the genus is an unusually well-defined one, and that nothing whatever can be gained by further division. However, if a subgenus *must* be recognized, let it contain only *longicaudus*, and be based upon the arboreal habits and hairy tail of that species, rather than on ill-defined characters that can be segregated only with considerable difficulty.

—*A. Brazier Howell.*

NOTES ON FLYING SQUIRRELS AND GRAY SQUIRRELS

It does not seem to be generally known to lovers of the out-doors that the flying squirrel is well distributed over a large area of the United States and Southern Canada. On March 27, while taking a walk in the woods of the bluffs of the Mississippi River, I tapped a dead poplar tree which looked to me as if the cavity in it might be the home of a flying squirrel. Within a few seconds, a flying squirrel did come out of the hole, but it was evidently very reluctant to leave its comfortable nest. It ran to the other side of the tree, entered by another hole and came out of the first hole again. This it did five times. My friend and I thought at first that we had discovered the home of a whole family of squirrels, but soon discovered that the little creature had been fooling us on the census. At last it climbed up to the top of the dead tree and then disappeared in the top of a live basswood to the right.

We returned to the same tree in about half an hour and again, by tapping the nest tree gently with a stick, induced the squirrel, which by this time had returned, to come out. On this occasion it uttered a rat-like squeak as it climbed up on the other side of the tree and again made for the top of the basswood. From that position it glided away about sixty feet to the bottom of another tree lower on the slope, gracefully clearing any of the intervening branches. On the 1st of April, I again visited the place. This time I had a camera with me and although I found it rather difficult to drive out the squirrel, and also take a picture, I succeeded in getting one fair photograph. The squirrel again had to be driven out several times before he finally left the nest and disappeared in the top of the basswood.

On April 10, I took a walk through the same woods and discovered in a scarlet oak tree near a field and a pasture, one of the well-known leafy squirrel nests about twenty feet up. The nest looked quite fresh and, when a friend tapped the tree with a stick, a large gray squirrel came out, apparently quite reluctant to leave the nest. As neither of us was dressed for climbing trees, we left the place without examining the nest. The next day, I returned and climbed the tree. I found the nest a very well-built, compact structure with a small entrance on the southwest side near the top. In the nest were four young. Although it had rained quite a little on the preceding day and for several hours during the night, the nest which was lined with very fine, soft grass, was perfectly dry, the structure being apparently rain proof. I took the young out, carried them down in my hat, covering them up carefully, and photographed them.

The backs were covered with very short gray hair, the bellies were still almost naked and had a pinkish appearance, the tails looked like rat tails and were about as long as the bodies and were covered with a very short growth of hair. The animals were about four inches and a half long, and their eyes were still closed. If they had had short tails, they would have resembled young bull pups very closely. They crawled about very much like young pups and kittens. The mother we did not see on this occasion. After photographing the young, my companion returned them to the nest. On both occasions, when they were taken out and when they were returned, they utttered a sharp squeak, which I could plainly hear with the wind at a distance of seventy-five yards.

I judge that the four young together weighed nearly as much as an adult gray squirrel. The nest was perfectly clean and dry, with no droppings or smell of urine about it, and I have wondered a good deal how the animals managed to keep it so clean. The young were apparently about a week or ten days old, which would mean that they were born about the first of April. We have had steady cold weather through the winter, including the first half of March, and only the last few days have been warm and spring-like. I was rather surprised to find the young squirrels in a nest of leafy twigs. I had the idea that they were generally born in a hollow tree. Possibly some of the readers of the Journal can give further information on both flying squirrels and gray squirrels.

The wooded strips of broken bluffs that line all our plains rivers are ideal resorts for small game animals and for song birds and game birds, and I think members of the society should endeavor to have game refuges established on land of this kind all over the country, where young and old can get glimpses of our interesting wild birds and animals. The strip of woods which I refer to extends about ten miles on the west bank of the Mississippi north from the town of Hastings toward St. Paul. The land is under cultivation to the edge of the bluffs, but the bluffs are too rough for cultivation, and the river bottom, from a mile to a mile and a half wide, is flooded during periods of high water, and is occupied by marshes, lakes and strips of river-bottom timber, including cottonwoods, soft maples, white ash, hackberry, and elm.

—*D. Lange.*

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DATES OF SHEDDING OF HORNS

Below are the dates on which examples of some of the species of deer, and the American antelope, dropped their horns in the National Zoological Park at Washington, D. C., during the season of 1919–1920.

Barasingha deer (*Rucervus duvaucelii*).....December 13; January 29
Prong-horned antelope (*Antilocapra americana*).....December 23
Virginia deer (*Odocoileus virginianus*).....January 25, 27, and 29
Black-tailed deer (*Odocoileus columbianus*).....January 26
Mule deer (*Odocoileus hemionus*).....February 24
American elk (*Cervus canadensis*).....March 3
European red deer (*Cervus elaphus*).....March 23
Japanese deer (*Sika nippon*).....March 31
Kashmir deer (*Cervus hanglu*).....April 8

Fallow deer (*Dama dama*).....May 3
Sambar (*Rusa unicolor*).....June 18
Hog-deer (*Hyelaphus porcinus*).....July 8

It would be interesting to have dates from other zoological gardens, both in America and Europe, for comparison.

—*N. Hollister.*

RECENT LITERATURE

Hall, Harvey Monroe, and Joseph Grinnell. LIFE-ZONE INDICATORS IN CALIFORNIA. Proc. California Acad. Sci., ser. 4, vol. 9, no. 2, pp. 37–67. June 16, 1919.

Few devices for handling the data of geographic distribution of animals or plants have been more useful than the life-zone. For satisfactory zonal diagnosis of a given locality it has usually been necessary to make an exhaustive study of the entire fauna and flora. To obviate this necessity, so far as California is concerned, is the hope of the authors of this paper, who proceed to list certain critical species of plants, amphibians, reptiles, birds, and mammals as life-zone indicators.

Almost at the outset the importance of recognizing local modifying factors is emphasized. Those considered are slope exposure, air currents, streams carrying cold water, evaporation from moist soil, proximity to large bodies of water, influence of lingering snow banks and of glaciers, changes in vegetal covering, extent of a mountain area, rock surfaces, miscellaneous local influences.

Five criteria are given as among those used in the selection of the life-zone indicators. Briefly stated these are (1) Only breeding records have been taken into account. (2) In plants perennials are usually preferred to annuals. (3) The more abundant a species the greater its value as an indicator. (4) A particular indicator, though constant in zonal position in one portion of its range may be unreliable when its entire range is considered, due "perhaps to the possible development of hardy strains in one portion of the range and not in another," or to some other cause. Furthermore, biotypes, similar in external characters but reacting differently to their environment, may escape detection by the taxonomist. (5) So far as possible, indicators listed by C. Hart Merriam are used, since the authors in the main accept his delimitation of the life-zones.

The lists of mammalian indicators include: For the Lower Sonoran, 78 forms belonging to 34 genera; Upper Sonoran, 48 forms, 18 genera; Transition, 27 forms, 14 genera; Canadian, 30 forms, 15 genera; Hudsonian, 7 forms, 5 genera. No mammals, reptiles or amphibians are listed for the Alpine Arctic, the sole indicator aside from plants being the rosy finch, *Leucosticte tephrocotis dawsoni*. It so happens that among the animals listed there are more mammalian indicators than bird, reptile, or amphibian for each zone except the Transition (which has three more bird indicators than mammalian) and the Alpine Arctic.

The paper will be of interest to every student of the distribution of the higher vertebrates of the western states.

—*Walter P. Taylor.*